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**Orthogonal designs, self-dual codes, and the Leech lattice.** (English) Zbl 1088.94027  
*J. Comb. Des.* 13, No. 3, 184-194 (2005).

The authors give a construction of an orthogonal matrix of order  $12n$ . They use this array to construct orthogonal designs which in turn produce self-dual codes over finite fields of odd order. Following a suggestion of Ozeki, they use these self-dual codes to construct, via construction A, the odd Leech lattice. Self-dual codes that produce this lattice are given for a variety of primes less than 100.

Reviewer: [Steven T. Dougherty \(Scranton\)](#)

**MSC:**

[94B25](#) Combinatorial codes  
[05B20](#) Combinatorial aspects of matrices (incidence, Hadamard, etc.)

Cited in 4 Documents

**Keywords:**

[orthogonal design](#); [self-dual code](#); [the Leech lattice](#)

**Full Text:** [DOI](#)

**References:**

- [1] and Sphere Packing, Lattices and Groups (3rd edition), Springer-Verlag, New York, 1999. · [doi:10.1007/978-1-4757-6568-7](#)
- [2] Dawson, *Ars Combin* 19 pp 303– (1985)
- [3] Georgiou, *Codes and Cryptogr* 25 pp 163– (2002)
- [4] and *Orthogonal Designs: Quadratic Forms and Hadamard Matrices*, Marcel Dekker, New York, 1979.
- [5] Harada, *Graphs Combin* 19 pp 203– (2003)
- [6] Leon, *J Combin Theory Ser A* 32 pp 178– (1982)
- [7] MacWilliams, *IEEE Trans Inform Theory* 18 pp 794– (1972)
- [8] and *The Theory of Error-Correcting Codes*, North-Holland, Amsterdam, 1977.
- [9] Ozeki, *Nihonkai Math J* 2 pp 155– (1991)
- [10] and *Orthogonal designs*, in *CRC Handbook of Combinatorial Designs*, and (Editors), CRC Press, Boca Raton, 1996, pp. 400-406.
- [11] *Codes and designs*, in *Handbook of Coding Theory*, and (Editors), Amsterdam, Elsevier, 1998, pp. 1229-1267. · [Zbl 0922.94011](#)

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